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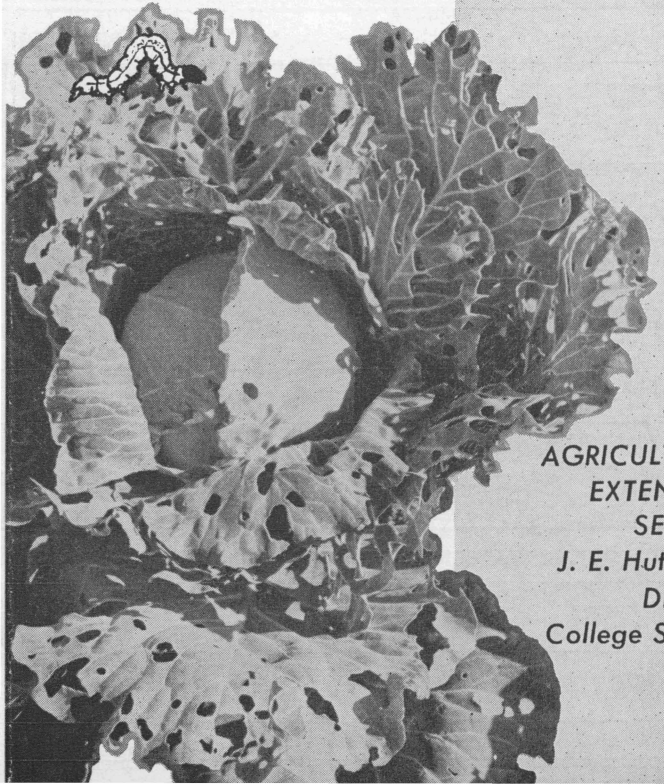
TEXAS GUIDE FOR CONTROLLING INSECTS ON

VEGETABLE CROPS



TEXAS AGRICULTURAL EXTENSION SERVICE
J. E. Hutchison, Director, College Station, Texas

TEXAS GUIDE FOR CONTROLLING INSECTS ON VEGETABLE CRO

EXTENSION ENTOMOLOGISTS
THE TEXAS A. & M. COLLEGE SYSTEM

WITH FEW EXCEPTIONS, vegetable insect control is a preventive program. Control measures should begin before insects appear in damaging numbers. Dusts and sprays are equally effective in most instances.

METHODS OF APPLICATION

Dusts—Insecticides and fungicides generally are compatible and may be applied simultaneously. Apply dusts at the rate of 15 to 20 pounds per acre with ground equipment and 20 to 25 pounds per acre by airplane. Use higher poundages on rank vegetation, such as large tomato and potato plants. Tractor dusters should have adequate fan capacity to give good coverage. Airplanes using a swath width no wider than the wingspread of the plane may be used to distribute dusts when the air is calm. Use flagmen to mark the swath width. *Thorough coverage is necessary to control pests such as aphids and spider mites on low-growing leafy crops.* Airplane dusting has failed in the control of aphids on radishes, turnips and other crops of this type. Hand dusters, especially the rotary type, are best adapted for treating home gardens and small fields. For the best results, do not apply dusts when the wind exceeds 6 miles per hour.

Sprays—Low-volume sprays have been successful in controlling insects. Unless otherwise specified, the emulsifiable concentrate should be used at the recommended rate of 7½ to 15 gallons of water per acre. Tractor sprayers should have two or three nozzles per row and should be operated at approximately 60 pounds pressure. Airplane sprays may be used with good results on most vegetables, but when a plane is used, the insecticide dosage should be increased 50 percent over the recommendations in this guide.

Garden Sprayers — The conventional 3 or 5-gallon knapsack sprayer with agitator and constant pressure is useful in garden insect control. Spray the plant thoroughly so that both leaf surfaces will be covered. Table 1 may be used to convert the amounts in the table to quantities suitable for small field or home garden use. It is based on an application rate of 100 gallons per acre. Emulsions or wettable powders may be used. Compounds such as parathion, Phosdrin, methyl parathion, Trithion, endrin, EPN, demeton or TEPP are not recommended for use in hand sprayers.

Table 1. Dilution Chart for Hand Sprayers*

	Percent emulsion concentrate	Tbsp. per gal. of water	Percent wettable powder	Tbsp. per gal. of water
Aldrin	25	½	25	2
Chlordane	75	½	40	4
DDT	25	2	50	2
Dieldrin	18.6	½	50	1
Heptachlor	25	1	25	2
Lindane	25	1	25	1
Malathion	50	½	25	2
Methoxychlor	25	2	50	2
TDE	25	2	50	2
Toxaphene	60	2	40	4
Diazinon	25	½	25	1
Kelthane	18.5	1	18.5	2

*Based on 100 gallons per acre of formulation.

PRECAUTIONS

All insecticides are poisonous and should be handled according to instructions on labels. *Special precautions should be practiced in handling TEPP, parathion, Phosdrin, Trithion, methyl parathion, EPN, endrin and demeton.* Do not breathe dust or mist or enter drift; wear Bureau of Mines approved respirators; have shirt sleeves rolled down; change clothes and bathe immediately after finishing work.

Vegetables having excessive residues of insecticides can be confiscated by the Pure Food and Drug Administration under regulations of the "Miller Bill." Growers should study and follow carefully recommendations in the Table which gives the number of days which should elapse between last application and harvest. Current changes in insecticide tolerances and uses will be distributed to county extension agents in the *Entomology Notes.*

CORN EARWORM CONTROL IN SWEET CORN

The corn earworm limits the production of quality sweet corn. Severe infestation may reduce sweet corn yields to 15 or 20 bags per acre. The homemaker's demand for a worm-free corn has made earworm control profitable.

The corn earworm moth often lays its eggs on the corn before the silks appear. Later the eggs are deposited on the silks. The eggs hatch within 2 or 3 days and the worms migrate to the silk channels and eat their way down to the immature ear. Control measures must be started before the worms have eaten their way to the ear tips. The following methods have given satisfactory control:

Individual ear method—An emulsion is made by mixing 3 quarts of 25 percent DDT emulsifiable concentrate with 2.0 gallons of white mineral oil of 65 to 90 seconds Saybolt viscosity and then dilute to 25 gallons with water. This emulsion should be mixed thoroughly before it is poured in the sprayer. Spray the emulsion directly on the silks three times at the rate of 1 teaspoonful per silk spike at 2-day intervals. Begin treatment when the first ears start silking.

This DDT-oil emulsion can be applied with a compressed garden sprayer equipped with a pressure gauge to maintain a pressure between 35 to 60 pounds during the spraying operation. The sprayer also should be equipped with a low-pressure nozzle having an orifice of 0.042 inches.

To cover large acreages rapidly, a small 30-gallon orchard sprayer may be mounted on two automobile wheels and pulled through the field by a mule. A boom with eight outlets is mounted on this sprayer above the height of the corn. Twenty-foot hoses with nozzles having rapid cut-off valves are attached to these outlets. Men spray the silks as this sprayer is drawn through the field. Eight men are able to spray 30 to 40 acres in a day with such a machine.

Sponge method—This is a simple method for controlling the corn earworm. A synthetic rubber sponge is cut the length of a man's finger and about three times its size in thickness. The sponge is dipped in a solution of DDT and oil,

Table 2. Spray recommendations are based on the formulations below. Examine the labels on all containers and if the formulation differs from these, consult your county agent or the extension entomologist for amount to use.

	Lb. per gal.
Aldrin	2
Dieldrin	1.5
Toxaphene	6
Toxaphene-DDT	4 of toxaphene and 2 of DDT
DDT	2
TDE	2
Heptachlor	2
Endrin	1.6
Diazinon	2
Demeton	2
Parathion	2
Malathion	5
Phosdrin	2
Trithion	4
TEPP	2
Kelthane	1.5
Lindane	2
Methyl parathion	2
Ethion	4

made by dissolving 1 pound of technical DDT in 25 gallons of white mineral oil of 65 to 95 seconds Saybolt viscosity. Press the sponge on the top of the ear silk until approximately ¼ teaspoonful runs in the silk. The silks should be treated only once in this manner, and they should be treated after a majority are bending down and before they have started to dry up on the terminals. Oil injury to ears results from applying excessive oil or from applying the DDT-oil treatments too early.

Brush method—Make four applications at 1-day intervals, by pressing a 1-inch stipple brush, dipped in a 5 or 10 percent DDT dust, into the silks. Begin treatment when the first ears start silking.

Fixed-boom sprayer — A high-clearance sprayer shows promise for applying sprays for earworm control. The boom should be made so that four nozzles will be directed at the ears in each row. The sprayer should be operated at 100 to 150 pounds pressure and equipped with a cone nozzle that will apply the spray at the rate of 35 gallons per acre.

The spray formulation is made by mixing: 5 gallons white mineral oil with a second Saybolt viscosity ranging from 65 to 90; 3 gallons of 25 percent emulsifiable DDT; and enough water added to make 100 gallons. Keep the emulsion well agitated during the spray application.

This emulsion should be applied to the corn three times at 2-day intervals, beginning when 10 percent of the ears show silks. Excellent earworm control has been obtained when the sprays were applied at the proper time and with the proper number of applications. This treatment will fail if applications begin after most of the ears have silked or when the interval between applications is longer than 2 days.

CONTROL OF INSECT PESTS IN PLANTING SEED

Peas and other seed to be stored and used for planting may be treated immediately after threshing with lindane, methoxychlor or DDT to protect them from stored grain pests. Do not consume or feed any seed treated with these materials. One ounce of 3 percent DDT, methoxychlor or ½ ounce of 1 percent lindane per bushel of seed is effective. No damage to seed viability has been observed as a result of treatment with either compound at recommended dosages.

Control of Insects in the Home Garden

This portion of the guide has been prepared especially for individuals growing home gardens. Certain insecticides are not included which ordinarily are recommended for use by experienced growers producing commercial vegetables. For some purposes, insecticides other than those mentioned may be recommended. However, with few exceptions, only those considered likely to be most generally available and to have widest use in the home gardens are included.

With few exceptions, vegetable insect control is a preventive program. To determine the correct time to start control, observe the plants frequently for signs of insects or insect damage. Apply insecticides when insects first appear and repeat treatments at 7 or 10-day intervals if infestations continue.

Insecticides may be applied as dusts or sprays.

DUSTS

Dusts are usually preferable for use in the home garden. They are packaged ready-to-use and can be applied with inexpensive equipment. Some dusts can be purchased in a cointainer that can be used to apply the material. Several hand-type dusters are on the market. In most cases, it is best to have a duster equipped with a tube and nozzle attachment which permits the dust to be directed to the underside of the leaves. Several brands of combination dusts containing two or more insecticides can be purchased to control both chewing and sucking insects. Apply an even light coating of dust at the rate of 1½ ounces per 50 feet of row. Force it through the foliage so that it reaches both sides of the leaves. Dusts should be applied when the air is calm.

SPRAYS

Sprays generally are purchased as emulsion concentrates or wettable powders. It is necessary to prepare sprays by mixing emulsion concentrates or wettable powders which are sold in different percentages with water. The usual hand equipment for applying sprays includes (1) compressed-air sprayer (2) trombone sprayer or (3) garden hose attachment sprayer. Sprayers that attach to the garden hose can be used successfully where 25 or more pounds of water pressure are available. If wettable powders are used, the solution must be agitated throughout the spray operation so as to keep the insecticide well mixed. Under most conditions, emulsion concentrates are easier to apply with hand sprayers than wettable powders. Apply about 1 quart of spray per 50 feet of row.

INSECTICIDES

Good insect control can be accomplished by treating the plants at the proper time with insecticides especially prepared for the home garden. Some of the common insecticides recommended for home gardens are *malathion, DDT, toxaphene, methoxychlor, rotenone and pyrethrum.* Malathion, DDT, methoxychlor and toxaphene can be purchased to use as dusts or sprays. Rotenone is usually available as a ready-to-use dust or it may be in a dust mixture with another insecticide. Pyrethrum is generally used as a spray but may be purchased with other insecticides in a dust mixture. When pyrethrum spray is used, follow dilution instructions given on the package. In some of the commercial dust mixtures, a fungicide is added to control certain vegetable diseases. Malathion, methoxychlor and DDT are usually available as a 5 percent dust while toxaphene is used as a 20 percent dust. Rotenone is generally packaged as a 0.75 percent or 1 percent dust.

POISON RESIDUES

Use only the insecticides which are recommended to control insects on a specific vegetable. Insecticide tolerances for most chemicals have been set by the Pure Food and Drug Administration. If the insecticides are used according to directions, there will not be a harmful residue on the vegetables at time of harvest.

Suggestions for Controlling Insects in the Home Garden

1. Check plants frequently and apply controls as needed.
2. In purchasing an insecticide, make sure that it contains the proper percentage of active ingredient. Read carefully the label on the package.
3. Use one of the insecticides listed above as a dust or spray. Two or more of the insecticides may be mixed together in a dust and purchased read-to-use.
4. If sprays are used, refer to the dilution chart below for mixing the emulsion concentrates or wettable powders with water, or follow mixing directions on the manufacturer's label.
5. Study the Table which lists specific crops and the harmful insects. Read the remarks column pointing out information concerning insect control.
6. For information on the number of days that should elapse from last application to harvest, consult the column listed for each specific crop.

DILUTION CHART for HAND SPRAYERS

Insecticide	Percent emulsion con.	Tbsp./gal. of water	Percent wettable powder	Tbsp./gal. of water
Spray No. 1 Malathion	50	⅔	25	4
Spray No. 2 Methoxychlor	Purchased as wettable powder		50	2
Spray No. 3 DDT	25	1½	50	3
Spray No. 4 Toxaphene	60	1½	40	3

SOIL INSECTS

Frequently soil insects, such as wireworms, cutworms, white grubs and mole crickets may be present in the soil and cause extensive damage to seed and young plants. Most soil insects can be controlled satisfactorily by properly treating the soil with chlordane about 4 weeks before planting.

The following amounts of chlordane may be used to treat 1000 square feet of surface area:

1. Two pounds of a 5 percent dust.
2. Three-fourths cup of 40 percent wettable powders in 2½ gallons of water.
3. One-fourth cup of 75 percent emulsion concentrate in 2½ gallons of water.

Apply the dust or spray to the soil surface and work the insecticide thoroughly into the upper 5 or 6 inches.

Cautions: Do not apply excessive amounts of chlordane to the soil. Do not apply to foliage that is to be eaten.

CAUTIONS

Most insecticides are poisonous. The recommended insecticides can be used in the home garden safely, provided precautions are followed carefully. Handle insecticides with care. Follow directions and precautions on the labels. In applying the insecticides, avoid inhaling them and do not get any of the chemicals in eyes, nose or mouth. Work on the windward side of the treated area. After using dusts or sprays, wash thoroughly and change clothing immediately.

For additional information contact your county agent or write the extension entomologist, College Station, Texas.

COVER PHOTO

Injury to cabbage caused by cabbage worms.

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Dust or Spray Program for

BEANS (Snap or Lima)

Insect	Dust	Spray amount per acre	Tolerance (PPM**)	No. days from last application to harvest	REMARKS
Aphid	1% parathion	1 pt. parathion	1.0	15	Sprays are more effective than dusts. Apply insecticides at 5-7 day intervals until control is obtained.
	5% malathion	1½ pt. malathion	8.0	1	
	4% Diazinon	1 pt. Diazinon	0.75	7	
	2% Trithion	1½ pt. Trithion	8.0	7	
Flea Beetle	7½% Sevin		10.0	0	Flea beetles may cause severe damage to seedling plants. Toxaphene dust may be used within 7 days of harvest if beans are washed.
	5% Heptachlor	1 qt. heptachlor	0	*	
	5% DDT	2 qt. DDT	7.0	7	
	10% toxaphene	1½ qt. toxaphene	7.0	*	
	5% methoxychlor		14.0	3	
Leaf hopper	5% DDT	2 qt. DDT	7.0	7	May attack seedling or older plants. Repeat treatment as needed.
	5% malathion	1 qt. malathion	8.0	1	
	5% methoxychlor		14.0	3	
	7½% Sevin		10.0	0	
	1% parathion	1 pt. parathion	1.0	15	
	2% Trithion	1 pt. Trithion	8.0	7	
Thrips	5% malathion	1 qt. malathion	8	1	May cause damage to seedling plants. Toxaphene and parathion dust may be used 15 days before harvest if beans are washed.
	20% toxaphene+	1½ qt. toxaphene+	7.0+	*	
	1% parathion	1 pt. parathion	1.0		
Corn earworm	5% DDT	2 qt. DDT	7.0	7	Attacks blossoms.
	5% methoxychlor		14.0	3	
	7½% Sevin		10.0	0	
Cabbage looper	20% toxaphene+	1½ qt. toxaphene+	7.0+	*	Toxaphene and parathion dust may be used 15 days before harvest if beans are washed.
	2% parathion	1 pt. parathion	1.0		Begin treatment when first ragging of leaves appear.
		1 qt. Phosdrin	0.25	1	
Leaf miner		1 pt. parathion	1.0	15	Sprays are more effective than dusts.
		1 pt. Diazinon	0.75	7	

BEETS

Beet webworm, leaf beetle, beet leafhopper	5% DDT	2 qt. DDT	7.0		Do not apply DDT after seedling stage if tops are to be used for food or feed. Apply insecticides at weekly intervals for beet leafhopper control.

CABBAGE, BROCCOLI AND CAULIFLOWER

Aphid		1-2 pt. Diazinon	0.75	7	Sprays are more effective than dusts. Early detection and control measures are important. Diazinon may be used on broccoli and cauliflower 5 days before harvest. Phosdrin may be used on broccoli and cabbage 1 day before harvest.
		1 pt. demeton	0.75	21	
		1 pt. Phosdrin	1.0	3	
		1 pt. TEPP	0	3	
Flea Beetle	5% methoxychlor		14.0	14(BROC.)	Methoxychlor may be used on cabbage 3 days before harvest and 7 days before harvest on cauliflower. Toxaphene may be applied on cabbage 7 days before harvest if outer leaves are to be stripped. If outer leaves are not to be stripped do not apply after heads begin to form.
	10% toxaphene	1-2 qt. toxaphene	7.0	*	
	5% heptachlor	1 qt. heptachlor	0	*	
Cutworm		2 qt. toxaphene	7.0	*	Sprays are more effective than dusts. Cutworms are early season pests. Refer above under remarks for use of toxaphene. DDT may be used on cabbage 14 days before harvest if outer leaves are removed.
		2 qt. DDT	7.0	*	
		2 qt. toxaphene-DDT (2-1 mixture)	7.0 & 7.0	*	
Harlequin cabbage bug	20% toxaphene	2 qt. toxaphene	7.0	*	Toxaphene may be applied on cabbage 7 days before harvest if outer leaves are stripped.
	2% parathion	1 qt. parathion	1.0	21	
	20% sabadilla			Exempt	
Cabbage worm	2% endrin	1 qt. endrin	0	*	Toxaphene plus parathion may be used on cabbage 21 days before harvest if outer leaves are stripped. Phosdrin may be used on cabbage and broccoli 1 day before harvest. Toxaphene plus malathion can be used on cabbage 7 days before harvest if outer leaves are removed.
	20% toxaphene+	2 qt. toxaphene+	7.0+	*	
	2% parathion	1 pt. parathion	1.0	3	
	20% toxaphene+	1½ qt. toxaphene+	7.0+		
	3% malathion	1 pt. malathion	8.0	*	

CANTALOUPES, WATERMELONS, CUCUMBERS AND SQUASH (Do not use DDT, toxaphene, sulfur, BHC or chlordane on cucurbits)

Squash bug	1% lindane	1-1½ pt. lindane	10.0	0	Do not apply dusts to cucurbits when plants are wet. Remove excess residue of lindane from squash and cucumbers. Parathion may be used on melons 7 days before harvest.
	1% parathion	1 pt. parathion	1.0	15	
Darkling beetle	1½% dieldrin	1½ pt. dieldrin	0.25	See Remarks	Do not apply dieldrin to melons after blossoming. Dieldrin may be used on summer squash 7 days of harvest and 14 days before harvest on cucumbers.
	5% heptachlor (granules)	1 qt. heptachlor	0	*	
Thrips	1% parathion	1 pt. parathion	1.0	15	Parathion may be used on melons 7 days before harvest.
	5% malathion	1 qt. malathion	8.0	1	
Cutworm	40% cryolite+ 60% citrus meal 5% DDT				Early season pest. Apply insecticides to soil only.
Aphid	2% parathion	1 pt. parathion	1.0	15	Sprays are more effective than dusts. Thorough coverage is important. Trithion has not been approved for cucumbers and squash.
	5% malathion	1 qt. malathion	8.0	1	
	4% Diazinon	1 qt. Diazinon	0.75	7	
	2% Trithion	1 pt. Trithion	0.8	5	
Melonworm	5% methoxychlor		14.0	1	Parathion may be used on melons up to 7 days of harvest.
	2% parathion	1-2 pt. parathion	1.0	15	
Leafminer		1 pt. parathion	1.0	15	Parathion may be used on melons up to 7 days of harvest. Sprays are more effective than dusts.
		1-2 pt. Diazinon	0.75	7	
Spider mite	2% parathion	1 pt. parathion	1.0	15	Parathion may be used on melons up to 7 days of harvest. Trithion has not been approved for use on cucumbers and squash. Sprays are more effective than dusts. Thorough coverage is important.
	2% Trithion	1 pt. Trithion	0.8	5	
		1 qt. Kelthane	5.0	2	
Cucumber beetle	1½% dieldrin	1 qt. dieldrin	0.25	*	Do not apply dieldrin to melons after blossoming. Dieldrin may be used on summer squash 7 days before harvest and 14 days before harvest on cucumbers. Endrin has not been approved for use on melons.
	1½% endrin	1½ pt. endrin	0	14	
	5% methoxychlor		14.0	1	
Leafhopper	1% parathion	1 pt. parathion	1.0	15	Parathion may be used on melons up to 7 days of harvest.
	5% malathion	1½ pt. malathion	8.0	1	

CARROTS

Flea beetle	20% toxaphene 5% DDT 1½% dieldrin 5% heptachlor	1 qt. toxaphene 2 qt. DDT 1 pt. dieldrin 1 qt. heptachlor	7.0 7.0 0.1 0	0 0 21 *	Do not use treated tops for food or feed.
Cutworm	20% toxaphene 12% toxaphene+ 8% DDT	1-1½ qt. toxaphene toxaphene-DDT (2-1 mixture)	7.0 7.0	0 0	Do not use treated tops for food or feed.
Beet webworm	5% DDT		7.0	0	Do not use treated tops for food or feed.
Leafhopper	5% DDT	2 qt. DDT	7.0	0	Do not use treated tops for food or feed.

EGGPLANT

Flea beetle and cucumber beetle	5% DDT 1½% endrin 20% toxaphene	2 qt. DDT 1 qt. endrin 1½ qt. toxaphene	7.0 0 7.0	5 14 5	
Spider mite	2% parathion 2% Trithion 2% Kelthane	1 pt. parathion 1 pt. Trithion 1 qt. Kelthane	1.0 0.8 5.0	15 7 2	Sprays are more effective than dust. Thorough coverage is necessary.

LETTUCE

Aphids		½-1 pt. demeton 1-1½ pt. Diazinon 1 qt. parathion 1½-2 pt. Phosdrin 1-1½ pt. TEPP	0.75 0.75 1.0 0.5 0	21 10 21 2 3	Sprays are more effective than dust. Thorough coverage is important.
Cucumber beetle	20% toxaphene 1½% dieldrin	1 qt. toxaphene 1 qt. dieldrin	7.0 0.25	See Remarks 21	Do not apply toxaphene after seedling stage for leaf lettuce. Seven days for head lettuce if outer leaves are stripped at harvest.
Cutworm	20% toxaphene 12% toxaphene+ 8% DDT 5% DDT	1½-2 qt. toxaphene 1½-2 qt. toxaphene- DDT (2-1 mixture) 2 qt. DDT	7.0 7.0+ 7.0 7.0	See Remarks	Do not apply after seedling stage.
Cabbage looper	20% toxaphene+ 2% parathion 2% Phosdrin	1½ qt. toxaphene+ 1 pt. parathion 1-2 pt. Phosdrin	7+1 0.5	21 2	Do not apply toxaphene after seedling stage for leaf lettuce. Remove outer leaves of head lettuce when toxaphene-parathion is used.
Corn earworm	10% DDT 10% TDE	2 qt. DDT 2 qt. TDE	7 7	See Remarks *	Do not apply DDT after seedling stage for leaf lettuce. Seven days for head lettuce if outer leaves are stripped. Do not apply TDE to leaf lettuce after seedling stage.
False chinch bug	1½% dieldrin 2% parathion 5% malathion	1½ pt. dieldrin 1½-2 pt. parathion 1 qt. malathion	0.25 1 8	21 21	Malathion can be used on head lettuce 7 days of harvest and 14 days of harvest for leaf lettuce.
Leafhopper	5% DDT 5% malathion	2 qt. DDT 1½ pt. malathion	7.0 8.0	See Remarks 10	Do not apply DDT after seedling stage for leaf lettuce. Seven days for head lettuce if outer leaves are to be stripped at harvest. Apply at weekly intervals starting when plants are young and continue until within 10 days of harvest for aster yellows control.

MUSTARD AND TURNIPS

Aphid Harlequin cabbage bug	5% malathion 2% parathion 2% Phosdrin	1 qt. malathion 1-2 pt. parathion 1-2 pt. Phosdrin	8.0 1.0 1.0	7 21 3	Sprays are more effective than dusts for aphid control. Thorough coverage is important.
Flea beetle	5% DDT 1% rotenone	1½-2 qt. DDT	7.0 Exempt	* 1	DDT can be applied within 21 days of harvest on mustard greens intended for processing.
Cabbage looper	2% parathion 2% Phosdrin	1 qt. parathion 1-2 pt. Phosdrin	1.0 1.0	21 3	Sprays are more effective than dusts. Thorough coverage is important.
False chinch bug	2% parathion 5% malathion	1 qt. parathion 1 qt. malathion	1.0 8.0	21 7	

*Do not use after edible portions begin to form

**Parts per million

***No residue when used as directed

Controlling Vegetable Insects

OKRA

Insect	Dust	Spray amount per acre	Tolerance (PPM**)	No. days from last application to harvest	REMARKS
Aphid	2% parathion	1 pt. parathion	1.0	21	
Spider mite	5% malathion	1 qt. malathion	8.0	*	
		1 pt. TEPP	0	3	
Corn earworm	5% DDT	2 qt. DDT	7.0	7	

ONIONS

	20% toxaphene+	1 qt. toxaphene+	7.0+	See Remarks	Do not apply toxaphene or dieldrin to green or spring onions. Dieldrin can be used on blub onions 14 days of harvest. No restriction for use of toxaphene on bulb onions.
	1% parathion	1 pt. parathion	1.0		
Thrips	2½% dieldrin+	1 qt. dieldrin+	0.1+		
	1% parathion	1 pt. parathion	1.0		
	5% malathion	1 qt. malathion	8.0	3	

PEAS (Blackeyes or cowpeas)

Aphid	5% malathion	1 qt. malathion	8.0	3	Sprays are more effective than dusts. Thorough coverage is important.
	2% parathion	1 pt. parathion	1.0	10	
Curculio	20% toxaphene	1½ qt. toxaphene	7.0	See Remarks	The adult weevil must be killed before egg laying begins. Treat when first pods are ½ inch long and repeat after 7 days. Single applications are not effective. Toxaphene dust may be used within 10 days of harvest if peas are washed.
Cabbage looper	20% toxaphene+	1 qt. toxaphene+	7.0+	See Remarks	Toxaphene plus parathion dust can be used 10 days before harvest if peas are washed.
	1% parathion	1 pt. parathion	1.0		
Corn earworm	10% DDT	2 qt. DDT	7.0	See Remarks	Do not apply to varieties with edible pods after blooms appear. Do not use treated vines for forage.
Leaf miner	2% parathion	1 pt. parathion	1.0	10.0	
Stink bug	5% malathion	1 qt. malathion	8.0	3	Toxaphene dust may be applied 10 days before harvest if peas are washed.
	20% toxaphene	1½-2 qt. toxaphene	7.0	See Remarks	

PEPPERS

Cutworm	12% toxaphene+ 8% DDT	2 qt. toxaphene-DDT (2-1 mixture)	7.0	5	
	20% toxaphene	1½ qt. toxaphene	7.0	5	
Flea beetle	5% heptachlor	1 qt. heptachlor	0	*	Apply on row at time of transplanting.
	5% DDT	2 qt. DDT	7.0	5	
	1½% dieldrin	1 pt. dieldrin	0.1	7	
Darkling beetle	1½% dieldrin	1 pt. dieldrin	0.1	7	
	5% heptachlor	1 qt. heptachlor	0	*	
Leafhopper	5% DDT	1 qt. DDT	7.0	5	
	25% toxaphene	1 qt. toxaphene	7.0	5	
Leaf miner	2% parathion	1 pt. parathion	1.0	15	Apply at 4-day intervals until control is obtained.
	20% toxaphene	1½ qt. toxaphene	7.0	5	Apply first treatment when fruit begins to set. At least 3 treatments at weekly intervals should be used.
Weevil fruitworm & budworm	12% toxaphene+ 8% DDT	2 qt. toxaphene-DDT (2-1 mixture)	7.0	5	
	1½% dieldrin+ 5% DDT	1 qt. dieldrin+ 2 qt. DDT	0.1	7	

POTATOES (Irish)

	1% parathion	1 pt. parathion	N.R.***	5	
Aphid	5% malathion	1 qt. malathion	8.0	0	Apply as needed and cover plants thoroughly.
	2% Phosdrin	1 pt. Phosdrin	0.25	1	
Colorado potato beetle	10% DDT	2 qt. DDT	N.R.***	0	Increase dosage for blister beetle control.
Flea beetle	20% toxaphene	2 qt. toxaphene	N.R.***	0	
Leafhopper					
Blister beetle					
Potato psyllid	5% DDT	2-3 qt. DDT	N.R.***		Begin treatment when insects first appear. Three or four treatments at 2-week intervals may be needed.

RADISHES

Aphid	2% parathion	1 pt. parathion	1.0	15	Sprays are more effective than dusts. Thorough coverage is important.
	5% malathion	1 qt. malathion	8.0	7	
	5% DDT	2 qt. DDT	7.0	0	
Flea beetle	1½% dieldrin	1 qt. dieldrin	0.1	21	
	5% heptachlor	1 qt. heptachlor	0	*	

SPINACH

	5% DDT	2 qt. DDT	7.0		Do not apply DDT after seedling stage (21 days on greens intended for processing).
Flea beetle	1½% dieldrin	1 qt. dieldrin	0.25	21	
	3% heptachlor	1 qt. heptachlor	0	*	
	5% DDT+	2 qt. DDT+	7.0+	See Remarks	Do not apply DDT plus parathion after seedling stage (21 days on greens intended for processing).
Leafhopper	1% parathion	1 pt. parathion	1.0		
	5% malathion	1 qt. malathion	8.0	7	
Cabbage looper		1 qt. Phosdrin	1.0	4	Sprays should be applied at the rate of at least 15 gallons per acre.

SWEET CORN

Budworm	Dusts are not effective	2-3 qt. DDT	7.0		No restrictions on use of corn kernels for human food. Do not ensile treated corn. Do not feed stover from sweet corn receiving late applications. Do not feed treated forage to dairy animals.
Corn earworm	5% DDT (See text)	2-3 qt. DDT	7.0		See text.
Flea beetle	5% DDT	2 qt. DDT	7.0		Do not feed treated forage to dairy animals or animals being finished for slaughter.

TOMATOES

Cutworm	20% toxaphene	2 qt. toxaphene	7.0	1	Remove excess residues of toxaphene at harvest.
	12% toxaphene+ 8% DDT	2 qt. toxaphene+ DDT (2-1 mixture)	7.0	5	
	5% DDT	2 qt. DDT	7.0	5	
Flea beetle	5% DDT	2 qt. DDT	7.0	5	Remove excess residues of toxaphene at harvest.
	20% toxaphene	1 qt. toxaphene	7.0	1	
	1½% dieldin	1 qt. dieldrin	0.1	7	
	5% heptachlor	1 qt. heptachlor	0	*	
Darkling beetle	1½% dieldrin	1 qt. dieldrin	0.1	7	
	5% heptachlor	1 qt. heptachlor	0	*	
Garden fleahopper	20% toxaphene+ 40% sulfur	1½ qt. toxaphene	7.0	1	Remove excess residues of toxaphene at harvest.
	1½% dieldrin	1 qt. dieldrin	0.1	7	
	5% heptachlor	1 qt. heptachlor	0	*	
Hornworm	20% toxaphene	1½ qt. toxaphene	7.0	1	Remove excess residues of toxaphene at harvest.
	5% DDT	2 qt. DDT	7.0	5	
	10% TDE	2 qt. TDE	7.0	1	
Leaf miner	2% parathion	1 pt. parathion	1.0	10	
	2% EPN	1 lb. EPN Wet. Powd.	3.0	3	
		1 pt. Diazinon	0.75	3	
Fruit worm	10% DDT	2 qt. DDT	7.0	5	May require three applications at 7-day intervals beginning at fruit setting. Examine for worms and eggs and continue treatment if necessary.
	10% TDE	2 qt. TDE	7.0	1	
	1½% endrin	1 qt. endrin	0	14	
Suckfly	5% DDT + 40% sulfur		7.0	5	
	5% heptachlor+ 40% sulfur		0	*	
Spider mite	4% Ethion	1-2 pt. Ethion	0	28	Sprays are more effective than dusts. Thorough coverage is important.
	2% Trithion	1-2 pt. Trithion	0.8	7	
	2% Kelthane	1 qt. Kelthane	5.0	2	
Leafhopper Psyllid	10% DDT	2 qt. DDT	7.0	5	In areas where beet leafhoppers appear begin control with DDT when plants are small and continue at 7-day intervals until approximately 2 weeks of harvest. Remove excess residues of toxaphene at harvest.
	20% toxaphene	1½ qt. toxaphene	7.0	1	

MISCELLANEOUS INSECTS

Armyworm Fall armyworm vegetable weevil	10% DDT	2 qt. DDT	Refer under specific crop for information on the number of days from last application to harvest.
	20% toxaphene	1½ qt. toxaphene	
Grasshopper	1½% dieldrin	1 pt. dieldrin	
	2½% aldrin	1½ pt. aldrin	
	20% toxaphene	1½-2 qt. toxaphene	
Harvester ant and fire ant	10% chlordane	See remarks	Treat individual hills. Follow directions on manufacturer's label.
	5% heptachlor		
Salt marsh caterpillar	1½% endrin	1 qt. endrin	Refer under specific crop for information on the number of days from last application to harvest.
	20% toxaphene+	2 qt toxaphene+	
	2% parathion	1 qt. parathion	
White grub, wireworm, southern corn rootworm, seed corn maggot	chlordane dieldrin		Apply chlordane or dieldrin at the rate of 2 to 3 pounds of technical material per acre and lindane at 1 pound of technical material per acre.
	lindane		